

fairly continuous and form a loop of intestine, the posterior division being evidently destined to form the cloaca and lower part of the canal. The final development of the hepatic duct takes place about the ninth day by a growth proceeding from the liver itself, and consisting of exactly similar material; this growth extends towards the lower part of the loop of duodenum, which is now distinct, and appears to blend with the coats of the intestine; around it, at its lower part, the structure of the pancreas is seen to be in process of formation. The further progress of development of the hepatic duct will, the author thinks, require to be carefully examined, but the details he has given in this paper have satisfied him of the correctness of the statement that the structure of the liver is essentially parenchymal.

ZOOLOGICAL SOCIETY.

June 8, 1847.—Harpur Gamble, Esq., M.D., in the Chair.

The following papers were read:—

1. ON THE FINNER WHALES, WITH THE DESCRIPTION OF A NEW SPECIES. BY J. E. GRAY, Esq., F.R.S. ETC.

Sibbald has described and figured two specimens of Finner Whale. Artedi, and after him Linnæus, regarded these figures as representations of separate species, but the characters which they gave for the species appear to depend solely on the state the specimens were in when described and figured. These species have been generally adopted in the Fauna of this country.

The WHALES appear to differ greatly from one another in the degree of mobility of the neck, as is well-shown in the union or separation of the cervical vertebræ, and in the variations in the development of their lateral and spinous processes.

The union or separation of the cervical vertebræ appears to afford good generic distinctions.

Duvernoy, in the second edition of Cuvier's 'Comparative Anatomy,' has observed, "In the Cetacea the seven cervical vertebræ of the genus *Balæna* are all soldered together, and sometimes the first dorsal is equally soldered to the cervical.

"In the genus *Physeter* the atlas is distinct, and the six other vertebræ are soldered.

"In the *Delphinus* the atlas and axis only are united, and the five other vertebræ remain separate, but they are very thin.

"Lastly, in the Rorquals (Pike Whales), *Delphinus gangeticus* (the genus *Platanista*), the Dugong and Lamantin, they are all or nearly all separate."—Duvernoy in *Cuv. Anat. Comp.* ed. 2. i. 195.

I may further observe, that in *Balænoptera rostrata*, which I have considered as the type of *Balænoptera*, the second and third cervical vertebræ are united by their spinous processes, while the fourth, fifth, sixth and seventh vertebræ are separate and well-developed; while in *Physalus Boops, antiquorum* and *Sibbaldii*, and in *Megapteron longimanus* they are all well-developed, and separate from one another. In the Grampus (*Orca gladiator*) the first five cervical vertebræ are

united together into one body, and the sixth and seventh are very thin, rudimentary and separate. In *Hyperoodon* all the cervical vertebræ are rudimentary and united, as in *Balæna*. In *Monoceros* the first and second cervical vertebræ are separate and large, and the remainder are very thin, separate, and nearly rudimentary.

M. Cuvier (*Oss. Foss.* v. 378, 380) has observed that the second and third cervical vertebræ of the Cape *Megapteron* are united together by their bodies: this does not appear to be the case with the Greenland *Megapteron longimanus*.

The union of the vertebræ in the different genera appears to take place at an early period in the life of the animal, for in the skeleton of a young *Balænoptera rostrata* which has the epiphysis of the vertebræ and arm-bones quite separate, the vertebræ were firmly united.

Cuvier, in his researches on the Whales (*Oss. Foss.* v. i. 378, 380. t. 26. f. 13 and 18), observes that the two kinds of true Whale (*Balæna*) might be distinguished by the form of the lateral processes; and Professor Eschricht of Copenhagen has made the same observation with respect to the Finner or Pike Whales (*Balænoptera*); and from what I have observed, they appear to present the best character for the distinction of the species, for there can be no doubt that the expanded lateral processes of the *Physalus antiquorum* must be for a very different purpose, and require very different muscles for their movements than the short lateral processes of *Physalus Boops* and *Sibbaldii*.

In my Essay on the Cetaceous animals published in the 'Zoology of H.M.S. Erebus and Terror,' from the examination of several skeletons and their fragments and the descriptions of different authors, I attempted to establish that there were three distinct British species, distinguished by good zoological and osteological characters. Having lately had occasion to examine other specimens, and being enabled to make more minute comparison, I am now satisfied that there is a fourth species which inhabits our coast, and the re-examination of these specimens has enabled me to correct some inaccuracies in my former account.

In the paper above referred to I proposed to divide the genus *Balænoptera* into three subgenera; but on reconsideration I think it preferable that it should be divided into two genera, retaining the name *Balænoptera* for one of the species, and using the old generic name of *Physalus* for the other three, the genera being established on both zoological and osteological characters.

GENUS BALÆNOPTERA, PIKED WHALES.

The pectoral fin one-third and the dorsal fin two-thirds the length of the body from the end of the nose. The second and third cervical vertebræ united by the spinous process. The lateral process of the second cervical vertebra rather expanded, united, wing-like. Vertebræ 46 to 48. The pectoral fin moderate, about one-eighth the length of the body. Dorsal fin behind the orifice of generation. Chest with longitudinal folds.

BALÆNOPTERA ROSTRATA, Gray, Zool. Voy. H.M.S. Erebus and Terror, 50. t. 2.

Balæna rostrata, Müller, Hunter, &c.

Rorqualus minor, Knox, Jardine N.L. 142. t. 7.

Inhabits the British coast, North Seas, Greenland.

There is a skeleton of this species in the British Museum, and a skull in the museum of the Hull Philosophical Society.

In this species the first cervical vertebra is rather broader than long; the central hole is half as high again as broad. The second and third cervical vertebræ are united together by the upper edge. The second cervical vertebra has a broad, much-expanded, lateral process, with an oblong central hole near the body of the vertebra, reaching rather more than half its length. The third, fourth, fifth and sixth cervical vertebræ have two (upper and lower) lateral processes; the upper process of the third is the shortest and least developed, and these processes increase in length to the sixth. The lower process of the third is the thickest; the fourth and fifth rather small, and in the sixth the basal part of the process is shorter, and the upper part much-elongated and thinner. The seventh has only the upper process, which resembles that of the first dorsal in form, but is smaller.

This species is the smallest of the family, and rarely if ever exceeds twenty-five or thirty feet in length. It is easily known by the white spot on the base of the upper side of the pectoral fin.

GENUS PHYSALUS, FINNER WHALES.

The pectoral fin one-fourth, the dorsal fin three-fourths the length of the body from the end of the nose. The cervical vertebræ all separate and free. Vertebræ 54 to 64. Pectoral fin moderate, about one-eighth the length of the body. Dorsal fin behind the orifice of generation. Chest with longitudinal folds.

This genus may be divided into two sections, according to the form of the transverse apophyses of the cervical vertebræ.

* *The transverse apophyses of the cervical vertebræ much-expanded, united, forming a ring in the second to the sixth vertebræ.* PHYSALUS.

1. PHYSALUS ANTIQUORUM.

Balæna Physalus, Scoresby.

Balænoptera antiquorum, Fischer, Syn. 325; Gray, Z. E. & T. 50.

Rorqual de la Méditerranée, Cuvier, Os. Foss.

Inhabits British Ocean, Mediterranean.

Skeleton at Black-Gang Chine, from Isle of Wight, and in Mr. Patch's show, from Plymouth.

The transverse apophyses are as broad as the body of the vertebra, and the latter is oblong, half as broad again as high. Vertebræ 54, viz. 7 cervical, 13 dorsal, 17 lumbar, and 17 caudal. The ribs are simple.

The lateral processes of the cervical vertebræ are much longer than the width of the body of the vertebra; the lateral process of the

second cervical has a small, nearly central perforation, and this perforation gradually becomes larger on each succeeding vertebra, until in the sixth it nearly occupies the whole disc of the lateral process, the seventh being only found with a narrow elongated process from the upper edge, the lower process being reduced into the form of a small tubercle.

The Plymouth specimen is travelling the country, curiously mounted in three caravans (the first containing the head, the second the thorax, and the third the middle of the tail), so as to exhibit the parts of the skeleton in their proper situations when the caravans are placed one after the other with their ends removed, and the cervical, lumbar, and caudal vertebræ suspended between or beyond them.

This specimen was found floating on the sea in a decomposed state on the 20th of October, 1831, in Plymouth Sound, and is said to have been 102 feet long and 75 feet in circumference, but most likely the abdominal cavity was distended by internal decomposition.

The lumbar vertebræ are thick and large; both these characters must render this Finner much more powerful and active in the water than any of its allies. The lower jaw 17 feet long; the blade-bone 32 inches by 51; the upper arm-bone 20 inches long by $10\frac{1}{2}$ wide; the lower arm-bone 31 inches long. The lumbar vertebræ are 11 inches long and 14 inches wide; the first rib 59 inches long and $10\frac{1}{2}$ inches wide at the sternal end. The chest-bone is 28 inches wide and 18 inches long.

In this skeleton the proprietor has placed a blade of Greenland whalebone (*Balæna mysticetus*) on one side, and several of South Sea whalebone (*Balæna australis*) on the other side of the upper jaw, in the place of the true baleen of *Physalus*.

There is a second skeleton, which most probably belongs, or is very nearly allied to this species, exhibited at Black-Gang Chine, on the south side of the Isle of Wight, which was caught near the Needles. It was 75 feet long, of a greyish colour.

The skull is 16 feet 7 inches long, 5 feet wide at the orbital notch; the lower jaw 16 feet 9 inches long; the sternum 26 inches wide and 14 long; the upper arm-bone 24 inches long, the lower 33 inches long.

This skeleton chiefly differs from the former in the bones of the arms being rather longer, though the body is one-third shorter; but the length of the Plymouth specimen may be over-estimated.

** *The transverse apophyses of the cervical vertebræ short, of the third, fourth, fifth and sixth separate.* RORQUALUS.

2. PHYSALUS (RORQUALUS) BOOPS.

The transverse apophysis of the second cervical vertebra thick, short, converging, but separate at the end; of the other cervical vertebræ slender, rather longer, far apart. The upper apophysis of the sixth bent down, rather elongate, the lower one thicker, shorter, and bent up at the end.

Skeleton in the British Museum. Taken on the coast of Wales and towed into Liverpool in 1846.

The length of the skeleton of the Liverpool specimen is 38 feet; the head is 9 feet long. The vertebræ are 60 in number, and there are 15 pairs of simple ribs.

The cervical vertebræ are all separate, and nearly equally developed; the body of the cervical vertebræ is squarish oblong, about one-fourth broader than high. The spinal canal is oblong, depressed, twice as wide as high. The second vertebra is twice as thick as the other, with two large broad lateral processes scarcely as long as half the width of the vertebra, coming together at the end, but separate, and leaving an oblong hole between them. The third, fourth, fifth and sixth each with superior and inferior narrower lateral processes, the upper one of the third being the narrowest, and gradually increasing in thickness to the sixth; the lower of the fourth rather the broadest, and of the sixth the thickest and most tapering at the end.

The third, fourth, fifth, sixth and seventh have only two rather short processes on each side, the upper process being the most slender, compressed and bent down, and the lower one conical, stronger, compressed; the processes of the third vertebra are the thinnest, and they gradually increase in thickness and strength to the seventh or last.

The specimen here described was mentioned in the papers of the day as a *spermaceti whale*!

3. PHYSALUS (RORQUALUS) SIBBALDII.

The transverse apophyses of the second cervical vertebra rather elongated, united, leaving only a small subcentral hole; of the other cervical vertebræ slender, shorter and far apart, nearly straight, directed out laterally.

Inhab. Coast of Yorkshire.

There is in the museum of the Hull Literary and Philosophical Society a very perfect skeleton of this species, taken in the Humber, which is fifty feet long. It has 64 vertebræ, as follows: cervical 7, thoracic 16, lumbar and caudal 41; and the arms and paddles are 6 feet 9 inches long; the ribs 16 pair, all simple. The baleen is black.

This specimen is said to have been eight years old, but on what authority I cannot learn.

I have to thank my friend Mr. Pearshall, the curator of the above museum, for his kindness in sending me a detailed drawing of the natural size of the cervical vertebræ of this interesting species.

For the purpose of comparison with the foregoing description, I here add the following account of the cervical vertebræ of *Megapteron longimanus*, or *Hunchback Whale*, from a fine skeleton in the collection of the British Museum.

The second cervical has two very large, thick, converging, lateral processes, as long as half the diameter of the body of the vertebra. The third, fourth, fifth, sixth and seventh have elongated, slender, superior lateral processes, which bend rather downwards, and the sixth and seventh rather forwards. The fourth and fifth have a very short, rudimentary, inferior lateral process, which is smaller on the

left side. The other vertebræ are without any process. The cervical vertebræ are all free.

The upper part of the spinous process of the second vertebra is very large and convex, covering this part of the next vertebra.

I may here remark that Professor Eschricht informed me that he could find no difference between the *Megapteron* of the North Sea and the Cape specimen in the Paris Museum. I may also observe that Cuvier (*Oss. Foss.* v. 381) described the Cape specimen as having the second and third cervical vertebræ united by the upper part of their body, which is not the case with our Northern specimen, and that Cuvier's figures of the lateral process of the Cape specimen are very different from the Northern one here described.

2. ON A NEW SPECIES OF APTERYX. BY JOHN GOULD, Esq.,
F.R.S. ETC.

We have abundant evidence that at some former period New Zealand, and probably the Polynesian Islands, have been inhabited by a remarkable group of Birds, of which the *Dinornis*, so ably described by Professor Owen, formed a part, and of which the genus *Apteryx* is the only form at present known to exist; this form, so different from all others, has been, and will ever be, regarded with great interest, as the sole remnant of a race of which every other genus is believed to be extinct. Hitherto a single species only of this genus has been recorded; I have therefore no ordinary degree of pleasure in introducing to the notice of this Meeting a second, and if possible a still more extraordinary one than that previously described, and as I reported to the meeting held on the 13th of April, I have intelligence of the existence of a third and much larger species than either of them.

The bird I am now about to describe has just arrived from New Zealand by way of Sydney, but unaccompanied by any information as to the locality in which it was procured, or any particulars of its habits and economy.

It appears to be fully adult, and is about the same size as the *Apteryx Australis*, from which it is rendered conspicuously different by the irregular transverse barring of the entire plumage, which, with its extreme density and hair-like appearance, more closely resembles the covering of a mammal than that of a bird; it also differs in having a shorter, more slender, and more curved bill, and in the structure of the feathers, which are much broader throughout, especially at the tip, and of a loose, decomposed, and hair-like texture. I propose to characterize this new species under the name of *Apteryx Owenii*, feeling assured that it can only be considered as a just compliment to Professor Owen, who has so ably investigated the group to which I believe it pertains.

APTERYX OWENII. *Ap. corpus superius fusco et fulvo transversim radiatum; plumis singulis, ad basim argenteo-fuscis, in medio saturatius fuscis, deinde fasciâ semilunari transversâ fulvâ, cui macula succedit informis nigra, ad apicem fulvis. Corpus inferius superiore pallidius, pluma enim quæque inferioris corporis tribus radiis fulvis, superioris tantum duobus ornatur; fulvus quoque color inferiore longius quam superiore corpore in apicibus plumarum extendit.*

Face, head and neck dull yellowish brown; throat somewhat paler; all the upper surface transversely rayed with blackish brown and fulvous; each individual feather being silvery brown at the base, darker brown in the middle, then crossed by a lunate mark of fulvous, to which succeeds an irregular mark of black, and terminated with fulvous; under surface paler than the upper, caused by each feather being crossed by three rays of fulvous instead of two, and more largely tipped with that colour; the feathers of the thighs resemble those of the back; bill dull yellowish horn-colour; feet and claws fleshy-brown.

Total length, from the tip of the bill to the extremity of the body, 18 inches; bill, from the gape to the tip, $3\frac{5}{8}$; bill, $\frac{7}{8}$ broad at the gape; tarsi, $2\frac{1}{4}$; middle toe and nail, $2\frac{1}{2}$.

Hab. New Zealand.

Remark.—In this species the wing is even more rudimentary than in the *Apteryx Australis*.

3. DRAFTS FOR A NEW ARRANGEMENT OF THE TROCHILIDÆ. BY JOHN GOULD, ESQ., F.R.S. (CONTINUED*), WITH THE CHARACTERS OF TWO NEW GENERA AND DESCRIPTIONS OF THREE NEW SPECIES.

METALLURA, gen. nov.

Char. gen.—*Rostrum* rectum, sublongum. *Plumæ* molles sericeæ. *Cauda* subgrandis, rotundata. *Gula* et *rectrices* infrà tanquam metallum expoliturum luminosæ. *Alæ* subgrandes. *Tarsi* nudi. *Pedes* subgrandes. *Digitus* et *unguis* postici digitum et unguem medios longitudine æquantés vel superantes.

Gen. char.—Bill straight, moderately long; plumage soft and silky; tail rather large and rounded; throat and under surface of the tail-feathers very luminous, like shining metal; wings moderately large and apparently adapted for an easy mode of flight; tarsi bare; feet rather large; hind-toe and nail as long or longer than the middle toe and nail.

Females.—Much less brilliant than the males in every respect, and in most of the species wanting the luminous mark on the throat.

The species are—

Trochilus cupreocauda, Gould.

Trochilus æneocauda, Gould.

Trochilus Alardi, Bourc.

Trochilus smaragdnicollis, D'Orb.

Trochilus Williami, Bourc.

DORYFERA, gen. nov.

Char. gen.—*Rostrum* forte, ad tertiam partem apicalem, quæ sursum curvatur, rectum. *Alæ* subgrandes. *Cauda* rotundata, subrigida, reetricibus singulis mucronatis. *Tarsi* aliquâ parte vestiti. *Pedes* magnitudine mediocri. *Digitus* et *unguis* postico digito et ungui medio longitudine æquales.

Gen. char.—Bill long, straight for three-fourths of its length, and inclining upwards to the extremity; wings moderately large; tail

* See vol. xix. pp. 401, 408, 421.

rounded, rather rigid, each feather ending in a point; tarsi partly clothed; feet moderate in size; hind-toe and nail as long as the middle toe and nail.

The species are—

Trochilus (Doryfera) Louise.

TROCHILUS (DORYFERA) VIOLIFRONS. *Troch. fronte maculâ rotundâ metallicè violaceâ notatâ; occipite, collo, et dorso superiore æneo-viridibus; dorso inferiore, et tectricibus caudæ superioribus, sordidè griseo-cæruleis; gulâ, et abdomine, nigris viride splendentibus; tectricibus caudæ inferioribus intensè violaceis; caudâ ipsâ nigrâ violaceo subnitente.*

On the forehead a round spot of beautiful metallic violet; back of the head, neck and upper part of the back bronzy green, passing into purer green on the back and shoulders; lower part and upper tail-coverts dull greyish blue; throat and abdomen black, with green reflexions; under tail-coverts deep violet-blue; wings purplish brown; tail black, slightly glossed with green; bill black; feet brown.

Total length, $4\frac{1}{8}$ inches; bill, $1\frac{1}{4}$; wing, $2\frac{1}{4}$; tail, $1\frac{3}{8}$.

Remark.—This most interesting addition to the *Trochilidæ* is precisely of the same form in every respect as *T. Louise*, but differs most remarkably in the colouring of its plumage, the forehead being violet instead of green, and the under surface black instead of golden green.

LOPHORNIS REGINÆ. *Loph. vertice, et cristâ, ferrugineo-rubris, plumis singulis maculâ viride ad apicem ornatis; loro, gulâ et colli lateribus, viridibus, candentibus; maculâ plumarum lanceolarum subviride albâ; nuchâ, et dorso superiore, fulgente viridibus; dorso inferiore, uropygio, et tectricibus caudæ superioribus, æneo-fuscis; uropygio lined albâ transversim fasciatâ; caudâ castaneo-fuscâ, reatricibus duabus intermediis ad apicem et margines, reatricibus etiam duabus externis ad margines, æneo-viridibus.*

Crown of the head and crest bright rusty red, each feather with a beautiful dark green spot at the tip; lores, throat and sides of the neck resplendent metallic green, beneath which is a patch of white lanceolate feathers; back of the neck and upper part of the back lustrous green; lower part, rump and upper tail-coverts bronzy brown; rump crossed by a distinct line of white; tail chestnut-brown, the tips and margins of the two middle and the margins of the external feathers rich bronzy green; abdomen light metallic green; wings purplish brown; bill reddish brown at the base, dark brown at the tip; feet brown.

Total length, $2\frac{3}{4}$ inches; bill, $\frac{1}{2}$; wing, $1\frac{5}{8}$; tail, $1\frac{1}{8}$.

Remark.—Nearly allied to *Lophornis Regulus* and *ornatus*, but differing from the former in having the crest-feathers broader and the green spots on the tips much larger. It is a very beautiful species.

TROCHILUS (GLAUCIS?) CÆRULEOGASTER. *Troch. vertice, nuchâ, uropygio, et tectricibus caudæ superioribus, æneo-viridibus; mento, colli lateribus, et dorso viridibus; gulâ, et abdomine, cyaneis; tectricibus caudæ inferioribus magnis, albis; caudâ nigrâ pallidè cyaneo nitente.*

Crown of the head and back of the neck dull bronzy green; back green, passing into bronzy green on the rump and upper tail-coverts; chin and sides of the neck green, gradually passing into the beautiful blue of the throat and abdomen; under tail-coverts largely developed and of a pure white; tail black, with steel-blue reflexions; wings purplish brown; bill black; feet brown.

Total length, $4\frac{3}{4}$ inches; bill, $1\frac{1}{8}$; wing, $2\frac{3}{4}$; tail, 2.

Remark.—About the same size as, and similar in every respect to, *T. Buffonii*, Lesson, but differs from it in the throat and abdomen being beautiful blue instead of green.

MISCELLANEOUS.

EGGS OF THE MOA OR DINORNIS OF NEW ZEALAND.

DR. MANTELL has just received from his son, Mr. Walter Mantell of Wellington, New Zealand, fragments of several eggs found imbedded with the bones of the Moa; these are the first relics of this kind hitherto discovered. The portions in Dr. Mantell's possession evidently belong to several eggs, and apparently to different species of the Moa. In their general aspect they resemble the eggs of the Ostrich, but the external surface of the shell, instead of being marked with small circular pits, is covered with short, interrupted, linear grooves, and which are variously disposed in different specimens. The shell is relatively thinner than that of the Ostrich, and the egg must have been much larger, for the fragments have but a very slight degree of convexity. Mr. Mantell succeeded in collecting an extensive series of bones (between 700 and 800) of different parts of the skeleton; among which are specimens of the mandibles, which have not previously been obtained. This collection is on its way to England, and will doubtless furnish some interesting additions to our knowledge of the remarkable gigantic birds of the Ostrich tribe which once trod the soil of New Zealand.

FOSSIL TREE.

At Wettin, near Halle, in Prussian Saxony, a fossil tree with its roots has lately been found in a quarry, and is completely denuded from the surrounding stone. It is fourteen feet high, it reaches the surface, where it is cut off, and its roots run out several feet in a nearly horizontal direction. It is an *Araucaria*, and the wood is partially transformed into Hornstein and partially into claystone (Thonstein). The stone consists of a sandstone with a cement of claystone, in which many fragments of feldspar are lying, and it rests upon a conglomerate of the formation of pit-coal (Steinkohle). The stratum of this stone-formation, in which the tree extends its roots, has an angle of inclination of 10° , and the tree stands perpendicularly upon it; while the strata lie nearly horizontally over the roots, though the stone-formation is the same. In the stratum of the root there are numerous leaves of a *Borassites*, of which a complete fan has also been found.—J. O. W. in the *Gardener's Chronicle* for Sept. 11, 1847.